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DEPARTMENT OF REGISTRATION AND EDUCATION

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Cir. no. 5

Entomological Series
CIRCULAR 3

METHOD OF DESTROYING GRASSHOPPERS

BY W. P. FLINT
Chief Field Entomologist

PRINTED BY AUTHORITY OF THE STATE OF ILLINOIS

URBANA, ILLINOIS
1919

NOTE.—Circulars 1 and 2 of this series were issued without number. Circular 1 —"The More Important Insecticides and repellents" —was printed in March, 1918, and Circular 2—"Clean Up the Chinchbug"—in October, 1918.

METHODS OF DESTROYING GRASSHOPPERS

By W. P. FLINT, Chief Field Entomologist
State Natural History Survey

Grasshoppers are not among our most destructive insects, but they certainly may be classed as regular boarders on most Illinois farms. Nearly every year there are parts of the state where it takes all the profits on certain crops, and in some cases all of the crops, to board

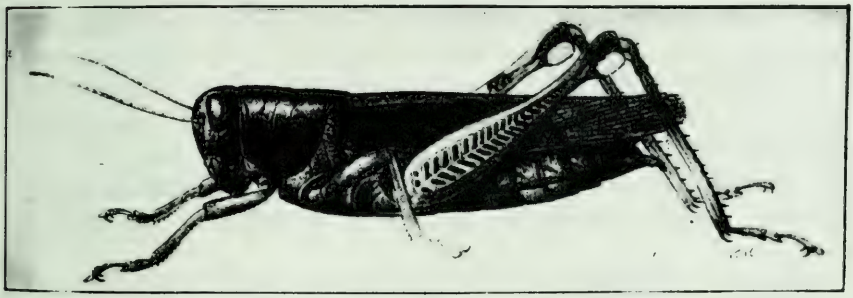


FIG. 1. A common Grasshopper (*Melanoplus differentialis* Thomas).

the grasshoppers. Most of this loss is easily preventable. It is possible not only to kill the hoppers, but, by measures that have recently come into use in the western states, to make them pay for the labor involved and possibly something more.

There are a number of kinds of grasshoppers in this state, but those that do most of the damage to crops have very similar habits. The females of the injurious kinds lay their eggs during the fall in small holes in the ground which they dig with the horny tip of the abdomen.

The eggs are generally laid along roadsides, ditch banks, and hedgerows, but may sometimes be found in clover, alfalfa, timothy, pastures, and even in corn. From fifteen to fifty eggs are laid in each hole, where they are held together by a sticky fluid which soon dries and seals them over, protecting them to some extent from the weather. They hatch through May and June. The young hoppers are so small that for the first two or three weeks they are not readily noticed by

one walking through a field where they are abundant, but a close examination made from the 10th to the 25th of June should enable one to tell whether they are numerous enough to threaten injury, and if such is the case control measures should be started at once. They grow at a fairly rapid rate, changing their skins as they increase in size, and



FIG. 2. Female grasshopper laying eggs in ground.

generally reach the full-grown, winged stage about fifty to sixty days after hatching. They continue to feed in this stage and by the first of September the females begin laying the eggs which will hatch the next season. There is one complete brood each year.

Dry years with open late falls are generally favorable to grasshopper development, and it is after such years that the most serious damage may be expected. This does not always hold true, as the



FIG. 3. Corn seriously damaged by grasshoppers, Sangamon county, Illinois, 1918.

grasshoppers have a number of natural enemies that sometimes check their increase.

The crops most seriously damaged in Illinois are clover, alfalfa, timothy, pasture grasses, soy-beans, cow-peas, and corn. If the weather continues warm late into the fall there may be some injury to wheat, and in years when the hoppers are very abundant young orchards are sometimes seriously injured.

Control Measures

POISONING

There are two methods that have generally proved effective in controlling grasshoppers in this state: poisoning and catching. For the former the medium most generally and successfully used, is a poisoned bran mash. This is prepared by thoroughly mixing twenty-five pounds of dry bran with a pound of Paris green, and making this into a stiff mash by adding water in which has been stirred either two quarts of cheap molasses or six oranges or lemons ground fine by running them through a meat grinder. The mash should be sowed broadcast over infested fields at the rate of five to eight pounds per acre.

Care should be taken to mix all the materials thoroughly. This may be done in tubs, tanks, or a wagon box, or on a piece of canvas spread on the ground. The mash may be sown by hand from a tub set in a wagon, or with an end-gate oats-seeder. It may be applied in strips about a rod wide and the same distance apart, as the odor of the mash will attract the hoppers from some distance. It is best to apply it early in the morning. One application generally kills from 60% to 75% of the hoppers. It is often possible to kill very large numbers of them at the time of cutting the first crop of clover by leaving several patches of an acre or more uncut for a few days and sowing liberally with the poisoned bran when the hoppers have gathered in these. In this way great numbers of the hoppers can be killed and damage to the second crop of clover prevented at small expense.

Do not look for dead hoppers until the second or third day after the mash has been put out, as it acts rather slowly. The mash may be safely used in any crop, but it is not advisable to sow it near buildings where chickens can pick up large amounts of it. At present prices it will cost from sixty to seventy-five cents for the materials to treat an acre of ground.

This method of killing grasshoppers has been found so effective that its use has been made compulsory under certain conditions in parts of Kansas. The county furnishes the materials, which are mixed

at central stations under the direction of township officials, and distributed as nearly as possible on the same day in all infested fields in the county. Amounts running into the hundreds of tons have been put out in this way.

CATCHING

A machine for catching grasshoppers commonly known as a hopperdozer has been used in this state more or less for a number of years. Another type of catcher has been in use in the western states for some time and was successfully operated in Illinois during 1918. With this latter type of machine, the general appearance of which is shown in Figures 4 and 5, the hoppers are caught alive and may be sacked and dried for chicken or hog feed during the winter, furnishing a food very high in protein which may be worth more than the expense of catching the hoppers.

The machine consists of a box 12 to 18 feet long and 2 feet high by 2 feet wide. The top and back of the box should be made of wire screen, and at least a part of the top should form a hinged cover through which the hoppers may be removed. The front is formed of a curved shield, 3 feet and 6 inches high, covered with tin or oilcloth and extending down to within 2 inches of the bottom. Below this shield is a curved tin lip extending downward and backward into the box and forward and upward about three inches in front of it. The box is set on runners made of 2 x 4's attached to a 2 x 6 which extends across the entire front and projects for three or four feet at each end. A little study of the plans shown in the two-page Figure 6 will enable anyone to build one of these catchers.

The hoppers are caught by hitching a horse to each end of the 2 x 6 and dragging the machine back and forth across the field. They fly against the shield, and slide down it and back into the box on striking the tin lip at the bottom. The back and top of the box, being made of wire screen, admit the light, and the hoppers nearly all try to escape in this direction instead of under the shield. When the box has become partly filled with hoppers the space between the lip and the shield may be stopped up and the catch scooped out and sacked. The sacks should be hung where they will be fully exposed to the sun and wind. The hoppers will dry in about two weeks of bright weather, and may then be removed to some dry shelter for use during the winter. *Do not pile the sacks of hoppers on the ground;* that will cause their decay. Chemical analysis of the dried hoppers shows that they contain about 75% protein and are fairly high in fat and phosphorus. At



FIG. 4. Rear view of hopper-catcher, showing covered back of box.

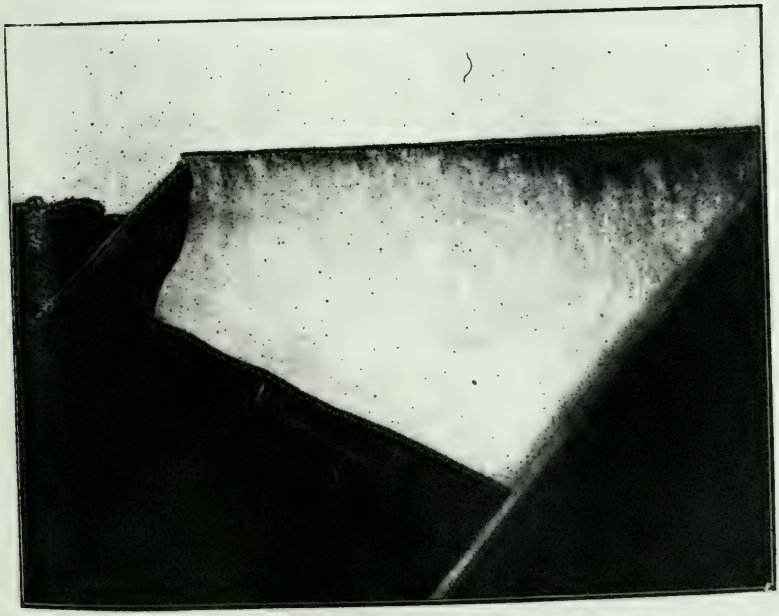
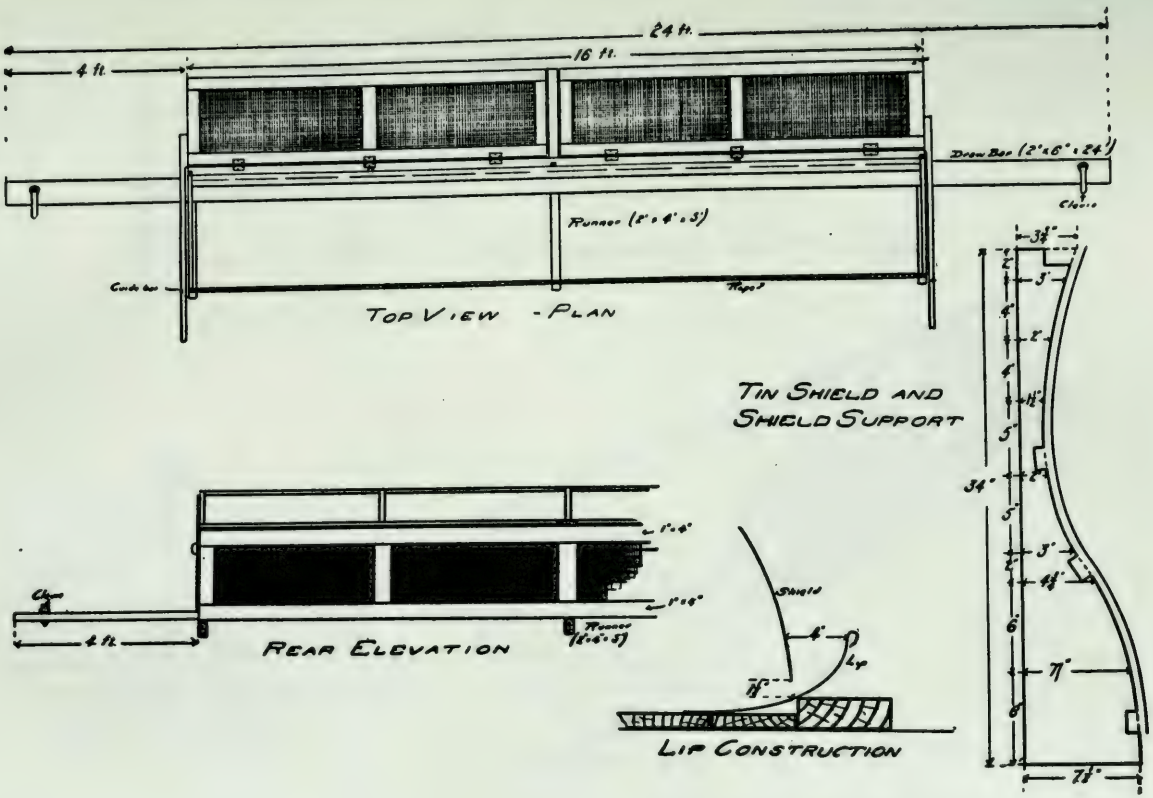


FIG. 5. Front of hopper-catcher, the shield and projecting lip at the bottom.


24 ft.
16 ft.
4 ft.
Runner (2" x 4" x 3')
TOP VIEW - PLAN
TIN SHIELD AND
SHIELD SUPPORT
34"
REAR ELEVATION
4 ft.
Shield
4"
LIP CONSTRUCTION

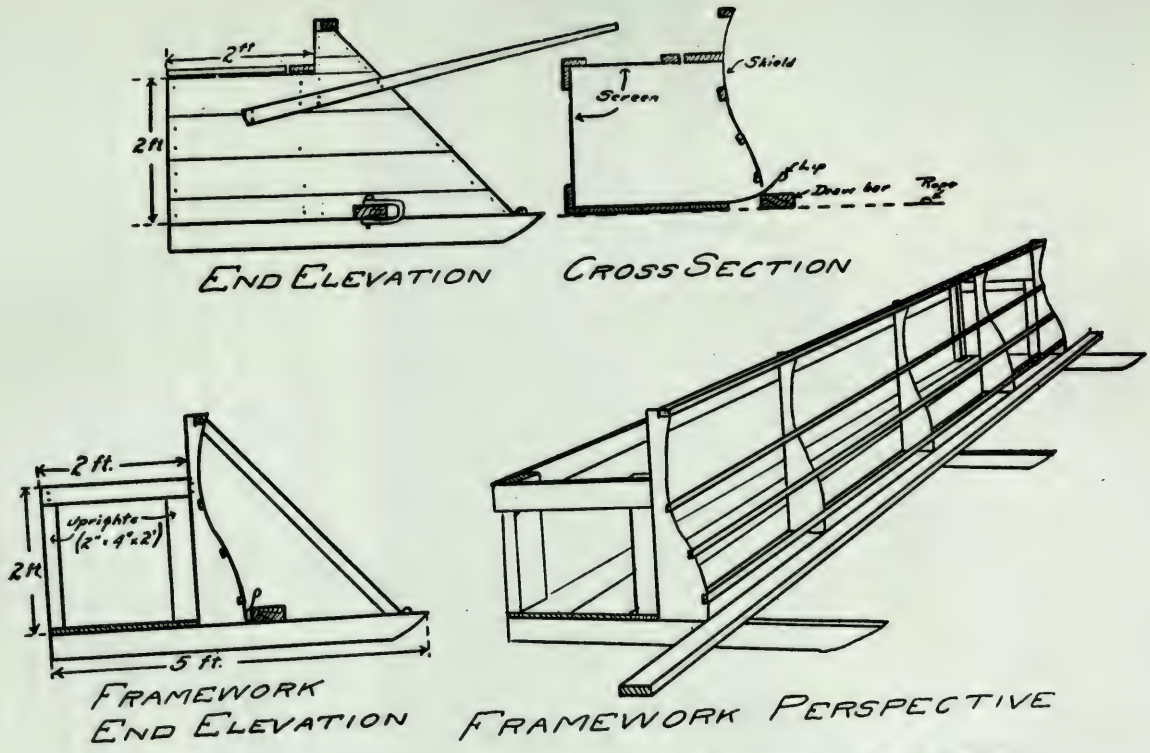


FIG. 6. Plans for grasshopper-catching machine. (From Circ. 76, Montana Agr. Expr. Station.)

the present price of tankage they should be worth not far from a dollar a bushel. Where the hoppers are abundant, from one to three bushels per acre have been caught with this machine.

The hopperdozer is made in the same way as the catcher without the box, but having a shallow trough or pan twenty inches wide, with six-inch sides, set on the 2 x 4 runners directly in front of the shield. This pan should have partitions across it every three or four feet. To operate the hopperdozer fill the pan partly with water, pour a little kerosene on top, and drag across the infested fields. The hoppers



FIG. 7. Demonstration in use of hopperdozer, Hancock county, Illinois, July, 1918. During the season over 100 bushels of hoppers caught with this machine.

striking the shield fall into the pan, where they are quickly killed by the oil. Once having become wet with the kerosene they will die in a few minutes even though they hop out of the pan.

The hopperdozer is somewhat easier and less expensive to build than the catcher, and is about as effective. A catch of sixty bushels on twenty acres of clover was recently made with one of these machines. It is more expensive to operate as the oil has to be renewed every few rounds of the field. It can not be used to advantage on rough or hilly ground. Hoppers caught with the dozer can not be used for feed, which makes it better to use the catcher is possible.

Either of these machines if well built and housed will last for several seasons and may be used by a number of farmers in the same neighborhood.

Does it Pay to Control Grasshoppers?

It has recently been shown by some work done in Arizona that where the hoppers average seventeen to the square yard of alfalfa over a forty-acre field they will eat a ton of hay per day. Where there was only one hopper to the yard they ate three pounds per day, per acre. It is not at all unusual to find an average of ten to thirty grasshoppers per yard in clover fields in this state, and at the present prices of hay it will certainly pay to control them. Even where the hoppers are only moderately abundant it will pay to use the catcher if they are saved for feed.

Urbana, Ill., March 11, 1919.

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